

CRS Report for Congress

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Navy Trident Submarine Conversion (SSGN) Program: Background and Issues for Congress

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Summary

The FY2006 budget completed the funding required in the Shipbuilding and Conversion, Navy (SCN) account for the Navy's program to refuel and convert four Trident ballistic missile submarines (SSBNs) into cruise-missile-carrying and special operations forces (SOF) support submarines (SSGNs). The first two converted SSGNs reentered service in 2006; the other two are scheduled to reenter service by late-2007. The total estimated cost of the four-boat conversion program is about \$4.0 billion. This report will be updated as events warrant.

Background

Trident Submarines. The Navy built 18 Ohio (SSBN-726) class nuclear-powered ballistic missile submarines (SSBNs) to serve as part of the U.S. strategic nuclear deterrent force. They are commonly called Trident submarines because they carry Trident submarine-launched ballistic missiles (SLBMs). The first Trident entered service in 1981, the 18th in 1997. The first 8 (SSBNs 726 through 733) were originally armed with Trident I (C4) SLBMs; the final 10 (SSBNs 734 through 743) were armed with larger and more powerful Trident II (D5) SLBMs. The boats were originally designed for a 30-year life but have now been certified for a 42-year life, composed of 20 years of operation, a two-year mid-life nuclear refueling overhaul, and then another 20 years of operation.

Origin of SSGN Conversion Concept. The Clinton Administration's 1994 Nuclear Posture Review (NPR) recommended a strategic nuclear force for the START II strategic nuclear arms reduction treaty that included 14 Tridents (all armed with D5 missiles) rather than 18.¹ This recommendation prompted interest in Congress and

¹ Consistent with this recommendation, the 5th through 8th Tridents (SSBNs 730 through 733) are being converted to carry the same D5 missiles carried by the final 10 Tridents. These Trident D5
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elsewhere in the idea of converting the first 4 Trident SSBNs (SSBNs 726 through 729) into non-strategic submarines called SSGNs,² so as to make good use of the 20 years of potential operational life remaining in these four boats and bolster the U.S. attack submarine (SSN) fleet, which has been significantly reduced in recent years. The Bush Administration's 2002 NPR retained the idea of reducing the Trident SSBN force to 14 boats.

Some observers supported the SSGN conversion concept³ while a few others questioned it.⁴ The Navy in the late 1990s generally supported the concept in principle but also expressed concern over its ability to finance all four conversions while also funding other priorities. Congress, as part of its action on the proposed FY1999 defense budget, directed the Secretary of Defense to report on the issue to the congressional defense committees by March 1, 1999. The report was delivered to Congress in classified and unclassified form in June 1999. The Bush Administration highlighted the program as an example of defense transformation.⁵

The Administration, in its amended FY2002 defense budget submitted to Congress in June 2001, requested funding to begin the refueling and conversion of SSBNs 727 and 729, and additional funding to begin the inactivation and dismantlement of SSBNs 726 and 728. Since the Administration, prior to submitting this budget, had highlighted the Trident SSGN concept as an example of defense transformation, it came as somewhat of a surprise, particularly to supporters of the SSGN concept, that the Administration requested funding to convert only two of the four Tridents. Navy officials said the

¹ (...continued)

conversions are not to be confused with the separate Trident SSGN conversions discussed in this report. The recommendation for a 14-boat force was made in expectation that the START II treaty would enter into force. The treaty has not entered into force. Section 1302 of the FY1998 defense authorization act prohibited U.S. strategic nuclear forces from being reduced during FY1998 below START I levels (including 18 Trident SSBNs) until the START II treaty entered into force. This prohibition was extended through FY1999 by Section 1501 of the FY1999 defense authorization act and was made permanent by Section 1501 of the FY2000 defense authorization act. The latter provision, however, also contained a section that would permit a reduction to 14 Trident SSBNs, even without START II entering into force, if the President certifies to Congress that this reduction would not undermine the effectiveness of U.S. strategic nuclear forces. For a general discussion of the START Treaties, see CRS Issue Brief IB98030, *Nuclear Arms Control: The U.S.-Russian Agenda*, by Amy F. Woolf.

² The G in SSGN stands for guided missile, a reference to the Tomahawk cruise missile or a potential future non-strategic land-attack missile.

³ See, for example, William P. Houley, "Making the Case for SSGNs," *U.S. Naval Institute Proceedings*, July 1999, pp. 47-49; Ernest Blazar, "A 'New Dimension' in Warfighting Capabilities," *Sea Power*, July 1999, pp. 37-40; Andrew Krepinevich, "The Trident 'Stealth Battleship,' An Opportunity for Innovation, CSBA Backgrounder, Feb. 24, 1999; Owen R. Jr. Cote, "How To Spend Defense Dollars," *Washington Times*, Jan. 15, 1999, p. 19.

⁴ See Norman Polmar, "A Submarine for All Seasons?" *U.S. Naval Institute Proceedings*, Aug. 1999, pp. 87-88, and Norman Polmar, "The Submarine Arsenal Ship," *The Submarine Review*, Jan. 1997, pp. 7-9.

⁵ For more on defense transformation, see CRS Report RL32238, *Defense Transformation: Background and Oversight Issues for Congress*, by Ronald O'Rourke.

decision was driven in part by Navy budget constraints, and that the deadline for committing to the refueling and conversion of SSBNs 726 and 728 on a timely basis⁶ had passed some time between late 2000 and June 2001. This also came as a surprise to some observers, since the Navy during the intervening months had not done much to publicize the impending deadline. The Navy later explained, however, that refueling and converting SSBNs 726 and 728 would still be possible if funds were provided in FY2002, though the schedule for planning and carrying out the operation would now be less than optimal. Congress, in marking up the FY2002 budget, increased funding for the program to the level the Navy said was needed to support a four-boat conversion program. The Administration subsequently pursued the program as a four-boat effort.

Description of the Conversion. The Tridents as converted are to carry up to 154 Tomahawk cruise missiles (or other non-strategic land attack missiles) and 66 Navy SEAL special operations forces (SOF) personnel.⁷ Each boat is to retain its 24 large-diameter SLBM launch tubes but be modified as follows:

- SLBM tubes 1 and 2 are altered to serve as lockout chambers for the SOF personnel. Each chamber is equipped to connect to an Advanced SEAL Delivery System (ASDS) or Dry Deck Shelter (DDS).⁸ Other spaces aboard the submarine are converted to berth and support 66 SOF personnel.
- Tubes 3 through 24 are modified to carry 7 Tomahawks each, for a total of 154 Tomahawks. Alternatively, tubes 3 through 10 could be used to carry additional SOF equipment and supplies; leaving tubes 11 through 24 to carry 98 missiles.
- The Trident SLBM fire control systems are replaced with tactical missile fire control systems, and certain other systems aboard the boats are modernized.

In addition to these changes, each boat undergoes a mid-life engineering (nuclear) refueling overhaul (ERO). Without EROs, the boats would have exhausted their nuclear fuel cores and been inactivated in the FY2003-FY2005 time frame.

Missions and Concept of Operations. Each SSGN is to be operated with two crews, like SSBNs. As a result, for each two SSGNs, at least one is to be on station in an overseas operating area at any one time. The boats are to operate as covert platforms for conducting strike (i.e., land attack) and SOF-support missions. In the covert strike role, the boats can fulfill a substantial portion of the in-theater Tomahawk missile requirements that are established by regional U.S. military commanders, and thereby permit forward-deployed multimission Navy surface combatants and SSNs to concentrate on other

⁶ As a matter of policy for ensuring the safety and reliability of nuclear propulsion, nuclear-powered ships with exhausted nuclear fuel cores are not permitted to wait any significant time between the exhaustion of their nuclear fuel cores and the completion of preparations to refuel them. If a ship cannot go immediately into a refueling operation, it is instead permanently inactivated. A decision to refuel a ship must therefore be made by a certain date prior to the refueling, so that the fuel cores and other equipment needed can be ordered and manufactured in time to be ready for installation when the ship comes into dry dock.

⁷ The Navy's SOF personnel are called SEALs, which stands for Sea, Air, and Land.

⁸ The ASDS is a new mini-submarine for Navy SEALs; the DDS is a less-capable predecessor.

missions. In their SOF-support role, the SSGNs can be functional replacements for the James K. Polk (SSN-645) and the Kamehameha (SSBN-642) — two older-generation SSBNs that were converted into SSNs specifically for supporting larger numbers of SOF personnel. The Polk was retired in 1999 at age 33; the Kamehameha was retired in 2002 at age 36. The report of the 2001 Quadrennial Defense Review, submitted to Congress in September 2001, directed the Secretary of the Navy to explore options for homeporting SSGNs in the Western Pacific.⁹ One candidate home port in this area is the U.S. island territory of Guam, where the Navy has forward-homeported three Los Angeles (SSN-688) class attack submarines. Another possible location is Pearl Harbor, Hawaii.

Trident SSGNs and Navy Transformation. As mentioned earlier, the Bush Administration highlighted the Trident SSGN program as an example of defense transformation, citing the conversion of a strategic-nuclear-forces platform into a non-strategic platform, the large number of cruise missiles that an SSGN will carry (which is several times the number that can be carried by a standard Navy attack submarine), and the large payload volume of the boats for carrying future advanced payloads. Some supporters of the program outside the Administration agree with this view. Others demur, arguing that Navy has converted older SSBNs into SOF-support submarines in the past, that the larger number of cruise missiles that the SSGNs will carry can be viewed as more of a quantitative difference than a qualitative one, and that funding the Trident SSGN program may actually have slowed the transformation of the Navy's submarine force by reducing the amount of funding available to the submarine community for research and development programs aimed at developing more radical and transformational changes to the Virginia-class attack submarine design. The submarine community intends to maximize the transformational value of the SSGNs by using them as at-sea test beds for conducting experiments on transformational ideas, such as using submarines as platforms for deploying large-diameter, highly capable unmanned underwater vehicles (UUVs). Even if one judges the program not transformational, one might still judge it to be cost effective in terms of the capabilities it provides and in realizing a full, 42-year return on the original procurement cost of the boats.

Cost. As shown in **Table 1** below, the Navy estimates the total cost for refueling and converting four Tridents (including both research and development as well as procurement costs) at about \$4.0 billion, or about \$1 billion per boat. This figure represents a substantial increase over earlier cost estimates: The cost of a four-boat conversion program was estimated at about \$2.4 billion in 1999-2000, and \$3.3 billion to \$3.5 billion in 2001-2002. The estimated cost of a four-boat program thus increased more than 60% since 1999-2000. Refueling and converting four Tridents avoids a near-term expenditure of about \$440 million to inactivate and dismantle them. The estimated net near-term additional cost to the budget to convert the 4 boats rather than inactivate and dismantle them is thus \$3.56 billion (\$4.0 billion less \$440 million), or about \$890 million per boat. DOD estimated in 1999 that the operating and support (O&S) cost for two SSGNs over 20 years would be \$1,645.3 million in constant FY1998 dollars, which equates to \$1,777.9 million in constant FY2005 dollars, or an average of about \$44.4 million per boat per year in constant FY2005 dollars. Using this figure, the total 20-year life-cycle cost for four Trident SSGNs (including research and development costs, annual

⁹ U.S. Department of Defense, *Quadrennial Defense Review Report*, Sept. 30, 2001, p. 27.

operation and support costs, and eventual inactivation and dismantlement costs) would be roughly \$7.6 billion in constant FY2005 dollars.

Table 1. FY2000-FY2011 Funding for SSGN Conversion Program
(by fiscal year, in millions of then-year dollars, rounded to nearest the million; totals may not add due to rounding)

	00	01	02	03	04	05	06	07	08	09	10	11	Total
R&D	13	36	72	82	66	20	24	26	0	0	0	0	338
SCN	0	0	354	996	1175	515	283	0	0	0	0	0	3323
OPN	0	0	0	110	0	120	6	10	132	1	1	0	381
Total	13	36	426	1187	1242	654	312	36	132	1	1	0	4042

Source: For FY2003 and prior years: Navy Office of Legislative Affairs, Mar. 23, 2005. For FY2004 and subsequent years: Navy Office of Legislative Affairs, April 14, 2006. R&D is funding in the Navy's Research, Development, Test & Evaluation (RDT&E) appropriation account in program element (PE) 0603559N. SCN is procurement funding in the Navy's Shipbuilding and Conversion, Navy (SCN) account. OPN is procurement funding in the Navy's Other Procurement, Navy (OPN) account.

Schedule. The first Trident conversion, for SSBN-726, began in November 2002 and was completed in January 2006. The ship reentered service as an SSGN on February 7, 2006. The second conversion, for SSBN-728, began in August 2003 and was completed in April 2006. The ship reentered service as an SSGN on May 25, 2006. The third, for SSBN-727, began in March 2004 and is to be completed in December 2006. The fourth, for SSBN-729, began in March 2005 and is to be completed in September 2007. The Puget Sound Naval Shipyard (PSNSY) at Bremerton, WA was assigned to do the refuelings and conversions of SSBNs 726 and 727, while the Norfolk Naval Shipyard (NNSY) at Norfolk, VA, was assigned to do the refuelings and conversions of SSBNs 728 and 729. General Dynamics' Electric Boat Division (GD/EB) of Groton, CT and Quonset Point, RI, the designer and builder of all 18 Tridents, is the prime contractor for the program. GD/EB is the conversion execution integrator for all four boats and is managing the completion of conversion construction activities.

Arms Control and "Phantom Warhead" Issue. On May 13, 2002, the Administration announced that it had reached an agreement with Russia on a new strategic nuclear arms treaty that would require each side to reduce down to 1,700 to 2,200 strategic nuclear warheads by 2012. The agreement appears to resolve, from the U.S. perspective at least, a potential issue regarding the counting of "phantom" strategic nuclear warheads on converted Trident SSGNs.¹⁰

¹⁰ Under the previous START strategic nuclear arms reduction treaties, the SSGNs would remain accountable as strategic nuclear launch systems because they would retain their large-diameter SLBM launch tubes. Four SSGNs, even though they carried no SLBMs, would be counted as carrying 96 Trident SLBMs each with 4 nuclear warheads, for a total of 384 warheads. Having to include 384 "phantom" warheads within the allowed START II U.S. strategic nuclear force of 3,500 warheads was viewed as problematic from a U.S. perspective, since it would deprive the United States of about 11% of its permitted warheads. The alternative of asking Russia to exempt SSGNs from the counting scheme was also viewed as problematic, since Russia would likely either refuse or ask for something significant in return. The phantom warhead issue would

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Oversight Issues for Congress

Potential oversight questions for Congress on the SSGN program include the following:

- Why did the estimated cost of a four-boat conversion program increase by more than 60% since 1999-2000? What Navy programs, if any, were reduced to help finance the cost increases for the SSGN program?
- Is the Navy adequately funding programs for unmanned underwater vehicles (UUVs) and other advanced payloads so as to take full advantage of the SSGNs' large payload capacity?
- If a decision is made to reduce the Trident SSBN force from 14 boats to 12, what would be the potential costs and merits of expanding the SSGN conversion program to include two additional Trident SSBNs?
- Since the Navy's plan for maintaining a fleet in coming years of 313 ships includes 4 SSGNs, why does the Navy's 30-year shipbuilding include no replacements for the 4 SSGNs, resulting in the disappearance of SSGNs from the fleet by 2029?¹¹

Legislative Activity For FY2007

FY2007 Defense Authorization Bill (H.R. 5122/S. 2766). The House and Senate Armed Services Committees, in their reports (H.Rept. 109-452 of May 5, 2006, page 171, and S.Rept. 109-254 of May 9, 2006, page 161, respectively) on H.R. 5122/S. 2766, recommended approval of the Navy's FY2007 request for \$26 million in research and development funding for the SSGN program.

FY2007 Defense Appropriations Bill (H.R. 5631). The House Appropriations Committee, in its report (H.Rept. 109-504 of June 16, 2006, page 250) on H.R. 5631, recommended approval of the Navy's FY2007 request for \$26 million in research and development funding for the SSGN program.

¹⁰ (...continued)

have been even more pronounced under a potential START III treaty that might have limited the United States to 2,500 or fewer nuclear warheads. The phantom warhead issue appeared to have receded for a time due to the Administration's originally stated intention to not complete ratification of START II, and to instead reduce U.S. strategic nuclear forces unilaterally, without the use of new treaties. This would leave only the older START I treaty, with its much higher permitted nuclear force levels, as an in-force treaty against which the SSGNs could be counted. On February 5, 2002, however, Secretary of State Colin Powell announced that the United States was seeking a legally binding agreement with Russia on future levels of strategic nuclear weapons. This created a potential for the phantom warhead issue to once again become potentially relevant. The new U.S.-Russian arms treaty announced on May 13, 2002, resolves the issue from the U.S. perspective by counting only operationally deployed strategic nuclear warheads and not strategic nuclear launch systems. Since the SSGNs will not deploy strategic nuclear warheads, the Administration is excluding them from the treaty's limit of 1,700 to 2,200 operationally deployed warheads. Russia to date has not publicly objected to this interpretation.

¹¹ For more on the 313-ship fleet and the 30-year shipbuilding plan, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.